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SUBJECT—

TITLE

FOREST INSECT SURVEY - SEASON OF 1942

SEQUOIA NATIONAL FOREST, CALIFORNIA

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by

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Berkeley, California
March 2, 1943

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Forest Insect Laboratory
Berkeley, California
March 2, 1943

FOREST INSECT SURVEY - SEASON OF 1942
SEQUOIA NATIONAL FOREST, CALIFORNIA

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ABSTRACT OF RESULTS

A. The 1941 Infestation (completed records).

1. Total pine timber killed on reporting areas. (Tables 1 and 2)

a.	Number of trees	640
b.	Volume	323,000 Board feet
c.	Average volume per acre	4.2 Board feet

2. Present classification - endemic.

3. Primary insects - Western pine beetle in ponderosa pine
   Mountain pine beetle in sugar pine
   Jeffrey pine beetle in Jeffrey pine.

4. Trend - decrease over 1940.

5. Control work - none.

B. The 1942 Infestation (partial record, 75% completed).

1. Primary insects - Western pine beetle in ponderosa pine
   Mountain pine beetle in sugar pine
   Jeffrey pine beetle in Jeffrey pine
   Engraver (*Ips confusus*) topkilling of ponderosa pine and sugar pine.

2. Probable trend - increase over 1941.

3. Control recommended - none.

FOREST INSECT SURVEY - SEASON OF 1942
SEQUOIA NATIONAL FOREST, CALIFORNIA

INTRODUCTION

The 1942 insect survey of the pine timber on the Sequoia National Forest, California, was made during October 18 and 19, 1942, by John E. Patterson and George R. Struble of the Bureau of Entomology and Plant Quarantine. The type of survey was determined by the generally rugged topography of the reporting areas and by the character of the infestation. The two previously established sample plots on Woodward Creek and in the Camp Nelson basin were examined, but since there was no infestation on them, they were not considered in arriving at the estimates for the 1942 insect loss.

In general, the 1942 infestation may be considered aggressively endemic on local areas with intervening gaps where practically no infestation existed. These conditions, together with the greatly scattered occurrence of infested trees over the greater part of the forest, made conventional sampling a haphazard procedure. Hence the survey resolved into reconnaissance counts from lookout points and occasional roadside strip measurements. The resulting data formed the basis for the loss estimates given later in this report.

This forest, in common with several other forested areas of the Southern Sierra region, presents unique problems in conducting insect surveys founded on large sampling units as a basis for general estimates. Due to the extremely rough topography and interrupted continuity of timber stands, infestations are seldom uniform over even single watersheds, and usually present great diversity in character and amount on larger areas. Under these conditions, sample plots of conventional size are largely inadequate as a yardstick for measuring insect losses on any one, or any group, of infestation areas. In future surveys of this forest, it is proposed that some other method of wider scope be employed.

RESULTS OF THE SURVEY

Character of the Infestation:

Activity of bark beetles over the entire forest was generally endemic but with pronounced aggressiveness on several local areas where a definite rise in losses resulted. Increased losses were evident on the southern part of the forest, whereas opposite conditions prevailed

throughout the central and generally in the northern sections. Wherever increased losses occurred, ponderosa pine and sugar pine were both affected. The type of trees selected in the 1942 attacks ran largely to individuals with vigorous crown indicating infestations in the aggressive stage.

Pronounced top-killing occurred during the year in the northern section of the forest. This type of injury was most prevalent in the ponderosa pine-sugar pine stands surrounding the Whittacker Forest where single trees were found infested but with no evidence of grouping, although attacks were widespread. Engraver beetles were responsible for this injury.

Infestations in Jeffrey pine were definitely lower throughout these stands. Insect-caused losses in Jeffrey pine during the year were the lowest ever recorded on this forest.

The estimated total losses from 1940 to 1942 on the Sequoia National Forest are shown in Tables 1 and 2. The total loss by entomological units is shown in Table 1, and the loss in board feet per acre in Table 2. The data for 1940 and 1941 are complete; those for 1942 are approximately 75 percent complete because late seasonal attacks had not become evident at the time the survey was made.

Table 1. Estimated Total Pine Losses by Entomological Units. Sequoia National Forest - 1940 to 1942, Inclusive.

Entomological Unit	Total Acreage	SPP	1940		1941		1942	
			No. Trees	MBM	No. Trees	MBM	No. Trees	MBM
Whittacker	30,000 A	PP-SP	200	111	120	60	80	45
Woodward Creek	14,000 A	SP-JP	165	100	90	40	60	30
Mineral King	10,000 A	PP-SP-JP	30	25	30	25	no estimate	
Wishon	13,000 A	PP-SP	35	65	20	18	110	100
Camp Nelson	20,000 A	PP-SP-JP	60	50	30	20	250	200
Tule River	30,000 A	PP-SP-JP	200	80	150	60	200	80
Kern River	32,000 A	PP-SP-JP	300	150	200	100	275	128
Totals	149,000 A		990	581	640	323	975	583

Table 2. Estimated Pine Losses per Timbered Acre by Entomological Units. Sequoia National Forest, 1940 to 1942, Inclusive.

Entomological Unit	Timbered Acreage	SPP	1940 BM per Acre	1941 BM per Acre	1942 BM per Acre
Whittacker	12,000	PP-SP	9	5	4
Woodward Creek	6,400	SP-JP	16	6	5
Mineral King	2,500	PP-SP-JP	10	10	no estimate
Wishon	2,500	PP-SP	26	7	40
Camp Nelson	8,000	PP-SP-JP	6	3	25
Tule River	20,000	PP-SP-JP	4	3	4
Kern River	25,000	PP-SP-JP	6	4	5
Totals	76,400		77	38	83
Averages	10,914		7.6	4.2	7.7

Trend of Infestations:

While the 1942 survey record shows a rise in insect losses from 4.2 to 7.7 board feet per acre average for all ponderosa pine-sugar pine stands, endemic conditions still prevail over the forest as a whole. This increase, however, is indicative of rising infestations which may become serious in 1943. The outlook is for increased losses in these stands in 1943, particularly on the Camp Nelson and Wishon areas.

It is believed that the activity of the engraver beetles which resulted in widespread topkilling in the northern stands reached a peak in early 1942 and rapidly declined during the last half of the season. No recent top fades were visible on the infested areas in October which would indicate that the flareup had spent itself and had greatly waned. This infestation is not expected to continue in 1943.

Infestations in Jeffrey pine were at a low ebb during the year, and since there is no evidence of change in this status, similar conditions are expected to prevail through 1943.

Insects Involved:

The western pine beetle, Dendroctonus brevicomis Lec., was the most abundant of the four species of forest insects involved in the infestations of 1942. It was found throughout the forest and the losses in ponderosa pine were largely attributable to this insect. Perhaps of next importance

was the mountain pine beetle, Dendroctonus monticolae Hopk., which was responsible for losses in sugar pine. Activity of the Jeffrey pine beetle Dendroctonus jeffreyi Hopk., was extremely limited in the 1942 infestations and cannot be considered a factor of importance in the general losses. Its attacks were confined to Jeffrey pine. The engraver, Ips confusus Lec., was abundant in the stands of the northwestern section of the forest during the early season of 1942 where it developed epidemic infestations locally. Extensive topkilling in both ponderosa pine and sugar pine resulted from its early seasonal attacks. However, its activity greatly diminished before the end of the season.

CONDITIONS ON ENTOMOLOGICAL UNITS

Converse Basin-Whittacker Forest

There is very little current infestation of the western pine beetle in ponderosa pine, or of the mountain pine beetle in sugar pine, on this unit. However, there is a moderate amount of topkilling of both these species throughout the west slope stands from Converse Basin south to Marble Fork of the Kaweah River. This damage is confined to the zone between the 5,000 and 7,000 foot contours and is about equally divided between the two tree species. It is the result of widespread attacks of the engraver beetle, Ips confusus Lec., and appears to be the result of a breeding up of these beetles in the great amount of windthrown timber laid down in February, 1941. There are hundreds of trees affected. The damage is confined exclusively to the tops where from 3 to 12 feet of the terminals have been killed. The injury is most abundant on the southwest slopes between Grant Park and Whittacker Forest where there is approximately 100 trees per section affected. Elsewhere in the region there is less than 50 damaged trees per section. No evidence was found indicating that the damaged trees were more susceptible to attack by the Dendroctonus beetles than were uninjured trees.

Woodward Creek:

Current losses on this unit, which is traversed by the scenic Generals Highway, are definitely lower than in previous years. Much of the infestation of the year is in sugar pine. However, the loss in this species will not exceed 10 trees per section over the entire unit. Insect losses in Jeffrey pine are definitely down. A 5-chain wide roadside strip run throughout the unit on the Generals Highway resulted in measuring two trees killed in 1941, and only one killed in 1942.

Camp Nelson:

Infestations in both ponderosa pine and sugar pine increased during the year. A viewing of the entire basin was obtained at two viewpoints from which all parts were visible. The topographic conditions of this unit

are such that estimating by this method is accurate and dependable. The estimated loss for the year is 250 trees; approximately 35% being sugar pine and 65% ponderosa pine. This number represents an increase of over 800% in the infestation since 1941.

Wishon:

Conditions on this small unit are very similar to those found at Camp Nelson. Infestation characteristics are the same and the relative losses are about equal. On both units the losses are due to the mountain pine beetle and the western pine beetle.

RECOMMENDATIONS

Infestation conditions on the Sequoia National Forest are not entirely satisfactory. However, losses in general are low and infestations are yet definitely endemic, and while this status continues, control work is not warranted or recommended. Because the Camp Nelson and Wishon units show evidence of aggressive beetle activity, developments during 1943 should be closely watched.